

**WHAT IS CLAIMED IS:**

1. An acoustic signal-processing apparatus comprising:

a band-dividing unit operable to divide a low frequency component in an entering acoustic signal into filtered components that belong to several frequency bands;

an overtone-generating unit operable to generate a plurality of overtone components based on each of the filtered components that belong to the several frequency bands; and

a combining unit operable to combine the entering acoustic signal with the plurality of overtone components generated by said overtone-generating unit,

wherein said overtone-generating unit is operable to generate the plurality of overtone components in such a manner that the plurality of overtone components generated by said overtone-generating unit meet a given condition.

2. An acoustic signal-processing apparatus as defined in claim 1, wherein the given condition is concerned with a degree of each of the plurality of overtone components generated by said overtone-generating unit.

3. An acoustic signal-processing apparatus as defined in claim 1, wherein the given condition defines that the plurality of overtone components generated by said overtone-generating unit fall within a range of a given frequency.

4. An acoustic signal-processing apparatus as defined in claim 1, wherein said overtone-generating unit generates one or more overtone components based on each of the filtered components that belong to the several frequency bands; and

wherein the given condition defines that a number of the one or more overtone components generated based on a filtered component that belongs to a higher frequency band among the several frequency bands is not greater than a number of the one or more overtone components generated based on a filtered component that belongs to a lower frequency band among the several frequency bands.

5. An acoustic signal-processing apparatus as defined in claim 1, wherein the

given condition defines generation of the plurality of overtone components for each of the several frequency bands, the plurality of overtone components having at least one of a reachable least degree and an degree greater than the reachable least degree, the reachable least degree being a least degree that reaches an envisaged speaker reproducible band.

6. An acoustic signal-processing apparatus as defined in claim 1, wherein the given condition defines that the plurality of overtone components generated by said overtone-generating unit fall within a range of a given frequency, and defines that the plurality of overtone components have a reachable least degree and a degree that is greater than the reachable least degree but falls within the range of the given frequency, the reachable least degree being a least degree that reaches an envisaged speaker reproducible band.

7. An acoustic signal-processing apparatus as defined in claim 1, wherein the given condition defines that the plurality of overtone components generated by said overtone-generating unit fall within a range of a given frequency, and that only the plurality of overtone components having a single degree for each of the several frequency bands are generated.

8. An acoustic signal-processing apparatus as defined in claim 7, wherein the single degree is a reachable least degree, the reachable least degree being a least degree that reaches an envisaged speaker reproducible band.

9. An acoustic signal-processing apparatus as defined in claim 7, wherein the single degree is set in such a manner that the plurality of overtone components generated based on the filtered components that belong to the several frequency bands have frequencies non-overlapped with each other.

10. An acoustic signal-processing apparatus as defined in claim 1, wherein each of the plurality of overtone components have amplitude set to decrease with an increase in frequency.

11. An acoustic signal-processing method comprising:  
dividing a low frequency component in an entering acoustic signal into filtered components that belong to several frequency bands;  
generating a plurality of overtone components based on each of the filtered components that belong to the several frequency bands; and  
combining the entering acoustic signal with the plurality of overtone components,  
wherein the plurality of overtone components are generated in such a manner that the plurality of overtone components meet a given condition.
12. An acoustic signal-processing method as defined in claim 11, wherein the given condition is concerned with a degree of the plurality of overtone components.
13. An acoustic signal-processing method as defined in claim 11, wherein the given condition defines that the plurality of overtone components fall within a range of a given frequency.
14. An acoustic signal-processing method as defined in claim 11, wherein said generating comprises generating one or more overtone components based on each of the filtered components that belong to the several frequency bands; and  
wherein the given condition defines that a number of the one or more overtone components generated based on a filtered component that belongs to a higher frequency band among the several frequency bands is not greater than a number of the one or more overtone components generated based on a filtered component that belongs to a lower frequency band among the several frequency bands.
15. An acoustic signal-processing method as defined in claim 11, wherein the given condition defines generation of the plurality of overtone components for each of the several frequency bands, the plurality of overtone components having at least one of a reachable least degree and an degree greater than the reachable least degree, the reachable least degree being a least degree that reaches an envisaged speaker

reproducible band.

16. An acoustic signal-processing method as defined in claim 11, wherein the given condition defines that the generated plurality of overtone components fall within a range of a given frequency, and defines that the generated plurality of overtone components have a reachable least degree and a degree that is greater than the reachable least degree but falls within the range of the given frequency, the reachable least degree being a least degree that reaches an envisaged speaker reproducible band.

17. An acoustic signal-processing method as defined in claim 11, wherein the given condition defines that the generated plurality of overtone components fall within a range of a given frequency, and that only the plurality of overtone components having a single degree for each of the several frequency bands are generated.

18. An acoustic signal-processing method as defined in claim 17, wherein the single degree is a reachable least degree, the reachable least degree being a least degree that reaches an envisaged speaker reproducible band.

19. An acoustic signal-processing method as defined in claim 17, wherein the single degree is set in such a manner that the plurality of overtone components generated based on the filtered components that belong to the several frequency bands have frequencies non-overlapped with each other.

20. An acoustic signal-processing method as defined in claim 11, wherein each of the plurality of overtone components has amplitude set to decrease with an increase in frequency.